Chapter 3 - Affected Environment

In this Chapter:

- Existing environment
- Protected resources

This Chapter describes existing conditions within the analysis area and general vicinity, as well as within the analysis area for each resource described. Analysis areas vary in extent, depending on the resource being studied for potential project impacts. For example, visual impacts of the projects would affect a larger area (i.e., the area from which the project could be seen) than soil impacts, which would be limited to the areas of ground disturbance. The analysis areas are briefly described under each resource.

3.1 Land Use

The analysis area includes the proposed BPA transmission routes and substation areas; about 22,000 acres for the proposed Klondike III facilities; and about 25,000 acres for the proposed Biglow Canyon facilities.

Nearly all of Sherman County is zoned F-1 (Exclusive Farm Use), as is the analysis area, except for some isolated nodes of commercial, industrial, and residential zoning designations in and around the city of Wasco. The F-1 zone restricts most development to preserve land for agriculture or resource extraction. Individual single-family dwellings are permitted if they meet criteria for dwellings in exclusive farm use areas. The area is sparsely populated, with only a few single-family residences spread out throughout the analysis area.

Most of the analysis area is under dryland wheat or barley production, with some areas in open range for cattle. In 2002, Sherman County had about 129,000 acres in wheat and barley production (2002 Agricultural Census, Sherman County Profile). Portions of the county are also enrolled in the ***Conservation Reserve Program*** (CRP), a voluntary federal program to assist private landowners to convert highly erodible and environmentally-sensitive cropland to permanent vegetative cover. Based on an analysis of soil types performed by Sherman County, no ground in the county is considered high-value farmland (see Section 3.4, Geology and Soils).

Most farming activities occur between March and October (David Evans and Associates, Inc. [DEA], 2005). Typical farm practices for dryland wheat farming in the area are spring land preparation, such as plowing, aerial fertilizing, planting seed and weeding. In the fall, farmers harvest spring and winter wheat, burn stubble, spread straw or crop residue, and reduce tall stubble by disking or harrowing. Winter wheat is planted in the late summer/early fall.

Sherman County has a Natural Hazards (NH) combining district, but BPA's proposed facilities, and the wind projects' proposed facilities are outside the district boundaries.

3.2 Transportation

The transportation analysis area encompasses northern Sherman County, Oregon.

The Sherman County Transportation System Plan (TSP) (Sherman County, 2003c) identifies all public rights-of-way within the County. The existing road system inventory includes all highways, arterial roadways, and collector roads within Sherman County. Roads in unincorporated or rural areas of Sherman County fall under either county or state jurisdiction.

3.2.1 Highway System

Highways within Sherman County are identified in Table 3-1 and shown on Map 3. As shown in Table 3-1, US 97 functions as a major arterial through the county and serves statewide and regional traffic demands. OR 206 (minor arterial) and OR 216 (major collector) serve regional and local traffic demands. The primary difference between the classifications of major collector and minor arterial is daily traffic volume.

I-84 is the main east-west highway through north central Oregon and the analysis area. US 97 is the primary transportation facility in Sherman County and is used to transport local products.

OR 206 (Wasco-Heppner Highway) begins at US 97 just west of Wasco and runs northwest/southeast to Condon and into Morrow County. OR 206 is a highway of regional importance and serves as the primary farm-to-market route between Sherman County and Condon. OR 206 (Celilo-Wasco Highway) is a highway of district importance. Beginning at I-84 at Celilo Village in Wasco County, OR 206 parallels I-84 across the Deschutes River into Sherman County.

3.2.2 County Roads

Although the state highway system forms the backbone of the roadway system in Sherman County, county roads are a vital part of the circulation system. Table 3-2 identifies local roads near the proposed transmission line and wind power projects. County roads are also shown on Map 3.

Table 3-1 Highways in Sherman County

State Route Number	Highway Name	ODOT Classification (ODOT Highway Number)	Sherman County Classification	Pavement Condition
I-84	Columbia River Highway	Interstate (2)	N/A	Good
US 97	Sherman Highway	Statewide (42)	Major Arterial	Fair
OR 206	Celilo-Wasco Highway	District (301)	Major Collector	Good/Fair
OR 206	Wasco-Heppner Highway	Regional (300)	Minor Arterial	Fair
OR 216	Sherars Bridge Highway	District (290)	Major Collector	Poor

ODOT = Oregon Department of Transportation; Source: Sherman County TSP, 2003c

Table 3-2 Local Roads near the Proposed Project

Road Name	Functional Classification	Pavement Type	Pavement Condition	Number of Lanes
Hildebrand Lane	Major Collector	Paved	Good	2
North Klondike Road	Major Collector	Paved	Good	2
Scott Canyon Road	Major Collector	Paved	Good	2
Herrin Lane	Minor Collector	Paved	Good	2
Klondike Lane	Minor Collector	Paved	Fair	2
Sandon Road	Minor Collector	Gravel	Fair	2
Beacon Road	Local	Dirt	Not rated	1 (>12 feet)
Biglow Road	Local	Gravel	Fair	1 (>12 feet)
China Hollow Road	Local	Paved/Gravel	Good	varies 1 to 2 lanes
Dehler Road	Local	Gravel	Poor	1 (>12 feet)
Egypt Road	Local	Dirt	Not rated	1
Emigrant Springs Lane	Local	Paved	Good	2
Gerking Road	Local	Gravel	Poor	1
Gosson Lane	Local	Gravel	Very poor	1
Greenberry Road	Local	Gravel	Fair	1
Helms Lane	Local	Paved	Good	2
Klondike Road	Local	Gravel	Fair	1
Macnab Lane	Local	Dirt	Not rated	1
Medler Lane	Local	Paved	Good	2
Oehman Road	Local	Gravel	Good	1
Tom Lane	Local	Paved	Good	2

Source: Sherman County TSP, 2003c

Near the proposed project, Sherman County maintains several collectors and local roads. All major collectors (Hildebrand Lane, North Klondike Road and Scott Canyon

Road) are two-lane paved roads in good condition. Minor collectors (Herrin Lane, Klondike Lane, and Sandon Road) are also paved two-lane facilities with the exception of Sandon Road, which is a two-lane gravel road. Both major and minor collectors are in fair to good condition and would be the primary access roads for the proposed projects.

Local roads that could be used for construction, operation and maintenance of the proposed projects vary in width and condition. Paved county roads with two lanes are generally 24 feet wide but can be as narrow as 16 feet with no shoulder. Medler Lane, located next to the BPA action alternatives and likely a primary access route, is a paved two-lane road in good condition. Gravel roads are generally 20 feet wide with no shoulders. There are several roads where the ROW is wider than 12 feet, but not wide enough to accommodate two lanes of traffic. Local roads are a mixture of paved, gravel, or dirt facilities; some roads alternate between gravel and paved surfaces. Most local roads near the projects are in fair to good condition, but Dehler and Gerking Roads, which would likely be used to access the proposed wind power projects during construction, and operation and maintenance, are rated in poor condition; Gosson Lane, near the proposed Klondike III facility, is in very poor condition. All three are gravel roads.

Sherman County primarily addresses roadway maintenance on an as-needed basis. It develops prioritized project lists each year through roadway inspection by maintenance crews and with the help of citizens who inform the County about maintenance needs, especially in rural areas not routinely traveled by maintenance personnel. Sherman County's maintenance department is responsible for all aspects of road maintenance including pavement rehabilitation, roadway signing and lighting needs, ditch and culvert clearing, and pavement marking.

The County does not normally pave new roads, mainly due to budget constraints. Generally, maintaining paved roads requires filling potholes and asphalt overlays. Gravel roads in Sherman County receive the most routine maintenance. Most gravel roads are bladed twice annually: once in the spring and once in the fall. All dirt roads are generally only graded to a minimal width to provide access to adjacent properties. The County approaches maintenance of dirt roads without a formal routine or preventive maintenance plan. The County also provides road maintenance services to the cities of Rufus, Wasco, Moro and Grass Valley. The County maintains some city streets and provides some snow removal service during the winter months for the roads that are heavily traveled, such as bus routes, or are needed for emergency service access.

3.2.3 Bridges

The Oregon Department of Transportation (ODOT) has jurisdiction over and maintains 77 bridges on state highways in both rural and urban Sherman County. There are 16 bridges located on I-84, 28 bridges on US 97, 16 bridges on OR 206 (Wasco-Heppner Highway), 15 bridges on OR 206 (Celilo-Wasco Highway) and spur, and three bridges on OR 216. Four state-owned bridges are functionally obsolete: two of the bridges are on I-84 east of Rufus; another is on US 97 as it crosses over I-84; and the fourth is located on OR 206 (Celilo-Wasco Highway) in Fulton Canyon. The bridges on I-

84 and US 97 would be on primary haul routes for the proposed projects. The bridge on US 206 is west of the analysis area and is not anticipated to be a primary haul route because truck traffic would use US 97 as a more direct connection to the proposed projects. While the three bridges on I-84 and US 97 are functionally obsolete, none are structurally deficient or have weight restrictions that would limit trucks and heavy equipment (ODOT, 2005).

Sherman County owns and maintains 10 bridges, one of which is identified as structurally deficient. The deficient bridge spans Mud Hollow Canyon and is on Mud Hollow Road west of US 97, is outside the analysis area, and would not be used for any of the projects.

3.2.4 Roadway Operations

Roadway operations are measured in level of service (LOS), where LOS is a function of both average travel speed and percent of time following the vehicle ahead. Six standards are used to identify LOS, from LOS A in which traffic is relatively free flowing, to LOS F, in which the system is saturated with traffic and movement is substantially slowed.

Traffic conditions along I-84 in Sherman County for average and peak summer traffic conditions was LOS A, where traffic is free flowing even at the height of summer conditions (Sherman County, 2003c). All other highways in the county also operate at LOS A (Sherman County, 2003c).

Even under projected worst case conditions in 2019 (TSP planning horizon), freeway, two-lane rural highway, and unsignalized intersection operations in Sherman County are expected to continue to operate at LOS A or B (Sherman County, 2003c). There are no identified capacity constraints within the county.

3.3 Recreation

The BPA Proposed Action and Middle Alternative lie entirely within the analysis area for the proposed wind projects.

All recreational facilities within 5 miles of the proposed Klondike III Wind Project and Biglow Canyon Wind Farm were identified as part of their respective *Applications for Site Certificates* (ASCs) (DEA, 2005; CH2MHill, 2005). Using the two ASC inventories, recreational uses and areas were identified from about 4 miles north of the Columbia River in Klickitat County to areas south of the community of Moro, and recreational facilities from the west of US 97 to east of the John Day River. Recreation facilities are shown on Map 4.

3.3.1 Recreation Facilities

In general, recreational activities in the county include camping, hiking, upland bird and big game hunting, rafting, boating, fishing, sightseeing (including observational

astronomy), nature and wildlife photography, and bicycling. Water-based recreation activities occur on the nearby John Day River. Recreational opportunities in the area are generally limited to "access by permission only" e.g., upland bird/big game hunting and observational astronomy and some viewing of historic trail alignments from county roads.

No important recreational facilities or opportunities exist along the proposed transmission line routes, substation sites, or within the two proposed wind projects' site boundaries except those mentioned above (DEA, 2005, CH2MHill, 2005).

Three important recreational facilities are within the vicinity of the proposed projects, but are outside the immediate project boundaries: the John Day River Corridor, the Journey Through Time Scenic Byway, and the Historic Oregon Trail and Barlow Road Cutoff Trail alignments.

3.3.2 John Day River

The John Day River system includes more than 500 river miles and is one of the longest free-flowing river systems in the continental United States. The main stem of the river between about river miles 0 and 26 runs through the proposed wind power facility analysis areas (for Biglow Canyon from river mile 0 to 20, for Klondike III from river mile 5 to 26). This segment is a designated Federal Wild and Scenic River and is classified as *Recreational*, meaning that at the time of designation, the segment was readily accessible by road or railroad, may have some shoreline development, and may have undergone some impoundment or diversion in the past. Outstanding remarkable values include the following: scenic, recreation, fish, wildlife, geological, paleontological, and archaeological. Botanical and ecological values are also deemed important (DEA, 2005; CH2MHill, 2005).

The segment is also designated as a State Scenic Waterway. The Scenic Waterway designation included the river itself and the lands that lie within 0.25 mile of its high water line. Scenic River Areas are administered to preserve their undeveloped character, maintain or enhance their high scenic quality, recreation, fish, and wildlife values, while allowing continued agricultural use. The guideline for new utility facilities in Scenic River Areas is that they share existing utility corridors, minimize ground and vegetation disturbance, and make use of non-visible alternatives when reasonably possible (DEA, 2005; CH2MHill, 2005).

The State of Oregon also established the John Day Wildlife Refuge in 1933, which includes the river segment in the analysis area. The primary purpose of the refuge is to protect wintering and nesting waterfowl (DEA, 2005; CH2MHill, 2005).

The primary recreational uses along this section of the John Day River include boating, rafting, and fishing. Secondary uses may include upland bird hunting, sightseeing, and nature/wildlife photography (DEA, 2005; CH2MHill, 2005). The US Department of the Interior, Bureau of Land Management (BLM) has developed the Oregon Trail Interpretive Site near the John Day River Crossing (a.k.a. McDonald Ferry) and the Rock Creek facility, both day use areas that provide boating access to the John

Day River. The interpretive site near McDonald Ferry also provides historical information about the Oregon Trail. Wheel ruts and scars are visible on the hillside from the interpretive site. There are no developed or undeveloped camping sites along this section of the river.

3.3.3 Journey Through Time Scenic Byway

The Journey Through Time Scenic Byway runs south from Biggs along US 97 through the analysis area to Shaniko, where it turns east, and eventually travels to Baker City. "Off the Beaten Path: A Guide to Oregon's Scenic Byways," published online by the Oregon Tourism Commission, characterizes this byway as celebrating 50 million years of Oregon history by providing a route through an area with abundant fossils, pioneer trails, ghost towns, and other remnants of the old West (Oregon Tourism Commission, 2006). The guide mentions these features along the segment of the scenic byway in the analysis area: Biggs, which is characterized as a traditional Native American salmon harvesting site; Wasco, with its original Columbia Southern Railroad depot; and Moro, home of the Sherman County Historical Museum.

Primary recreational uses include sightseeing and road touring. There are no developed scenic overlooks or waysides along the byway in the analysis area. Bicyclists tend to avoid US 97 due to the relatively heavy traffic volumes (DEA, 2005) including commercial traffic.

3.3.4 Historic Oregon Trail and Barlow Road Cutoff Trail Alignments

Although the historic Oregon Trail and Barlow Road Cutoff trail alignments technically meet the criteria of being important recreational opportunities, agricultural practices and other development activities have destroyed nearly all evidence of the trails in the analysis area. The only accessible, intact segment that has been identified near the proposed projects occurs near McDonald Ferry on the John Day River. The Oregon Trail is also described in Section 3.10, Cultural Resources.

Historic trail crossings at county and state roads are signed to some degree, but many signs are dilapidated or missing. Further, the surrounding landscape is primarily private land cultivated for wheat, so the recreational opportunity is limited to visiting and viewing the approximate historic alignments from county roads.

3.3.5 Federal and Local Management Plans for Recreational Resources

Section 3.8, Visual Resources, describes the applicable management plans for recreation, which focus on scenic and aesthetic values within the analysis area that may apply.

3.4 Geology and Soils

The analysis area for geology is northern Sherman County; the analysis area for soils encompasses the areas in which ground disturbance may occur for the BPA action alternatives, the Klondike III Wind Project, and the Biglow Canyon Wind Farm.

Geology and soils characteristics for those portions of the proposed transmission line routes outside the wind farm analysis areas are similar to those within them (DEA 2005; GRI 2005; and CH2MHill 2005).

3.4.1 Topography

Topography within the area is typified by gently rolling to level ground located along a high plateau south of the Columbia River. Areas of steep slopes are confined to portions of the Deschutes River Canyon to the west and John Day River Canyon to the east, including several unnamed intermittent tributaries. Elevations range from 185 feet above sea level along the Columbia River to 3,600 feet on the highlands in southern Sherman County (CH2MHill, 2005). Elevations along the plateau, within the analysis area, range from about 950 to 1,500 feet.

The proposed transmission line would begin in the western portion of the analysis area, at about elevation 1,500 feet near the existing Klondike Schoolhouse Substation. The line would extend northwesterly toward the existing John Day Substation at about elevation 950 feet. With both action alternatives, the line would traverse a series of low, east-west-trending ridges, where slopes are typically in the range of 3 to 8 percent (GRI, 2005). The proposed Klondike III turbines would be on a relatively flat topographic plateau between 1,250 to 1,500 feet in elevation. Slopes in the turbine locations are typically less than 3 percent. Tower locations would not encroach on steeper areas to the south along Grass Valley Canyon. Topographic conditions are similar in the area of the proposed Biglow Canyon Wind Farm (CH2MHill, 2005).

3.4.2 Geology

The analysis area is in the Deschutes-Columbia Plateau ***physiographic*** province, a north-sloping, volcanic plateau that covers over 60,000 square miles in Oregon, Washington, and Idaho. Volcanic rocks mapped as Columbia River Basalt Group underlie nearly the entire province. Most of the area is mantled by brown, fine-grained, silty soils, referred to as loess. The thickness of loess observed in road cuts is typically 4 to 6 feet.

No landslide deposits are mapped within the project boundary (Bela, 1982; scale 1:250,000). The transmission line route alternatives would not cross areas mapped with the potential for slope stability, flooding, or erosion-related geologic hazards (GRI, 2005). No obvious surface evidence of large-scale, deep-seated slope instability, or evidence of faulting or ground rupture, along the eastern two-thirds of the alignment or the area around the line terminus was observed (GRI 2005). Review of aerial photography did not reveal evidence of slope instability, faulting, or ground rupture in the project vicinity.

The Klondike III project area is underlain by a surface layer of silt (loess) 4 to 6 feet thick, overlying basalt (GRI 2005). Review of aerial photography did not reveal evidence of slope instability, faulting, or ground rupture (GRI, 2005).

The Biglow Canyon project area is also underlain by a surface layer of silt (loess) overlying basalt. No obvious surface evidence of large-scale, deep-seated slope instability, or evidence of faulting or ground rupture was observed; and aerial photography did not reveal evidence of slope instability, faulting, or ground rupture (CH2MHill, 2005).

3.4.3 Geologic Structure

The analysis area lies between the Deschutes and John Day rivers, between the Columbia Hills Anticline to the north (Newcomb, 1966) and the Gordon Ridge Anticline and Grass Valley Syncline to the south (Bela, 1982). The analysis area lies about 180 miles inland from the surface expression of the Cascadia Subduction Zone. The subduction zone is a broad, eastward-dipping zone of contact between the upper portion of the subducting slabs of the Gorda and Juan de Fuca plates, and the over-riding North America Plate (GRI, 2005).

3.4.4 Soils

The near surface soils in the project vicinity were identified using the US Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Soil Survey of Sherman County, Oregon (Macdonald et al., 1999). The soils in the area are grouped into five General Soil Units – Wato-Anders, Walla Walla-Anderly, Wrentham-Lickskillet-Rock Outcrop, Lickskillet-Nansene, and Mikkalo-Ritzville. Each general soil unit is composed of several soil series units, which are delineated at a greater level of detail, but share relatively similar spatial coverage and engineering properties as the general units. Table 3-3 provides a listing of these detailed soil units, including their drainage class and erosion potential. Soils in the area are shown on Map 5.

Area soils are susceptible to accelerated erosion caused by disturbance of natural conditions through burning, excessive grazing, or tillage (NRCS, 1964). These disturbances increase the potential for erosion by wind and water. Wind typically presents the greatest source of erosion due to the arid climate. Water erosion is typically less serious because much of the precipitation comes in the form of gentle rain. However, localized rain of high intensity, prolong duration, rain on frozen ground, and rapid snowmelt events can cause considerable runoff, and soil losses on unprotected soils are then high (NRCS, 1964).

The analysis area is dominated by Walla Walla silt loam. The NRCS Soil Survey of Sherman County (1999) identifies Walla Walla silt loam, deep and very deep, as being well suited for wheat and moderately well suited for barley. The State of Oregon and NRCS have identified seven soil map units as farmland of statewide importance and seven soil map units as prime farmland only if irrigated, although none of these soil units are currently irrigated in the analysis area. Only one small section of land next to the

John Day Substation is irrigated and its soil type is within the Kuhl soil complex, which is not considered prime farmland if irrigated. Based on additional analysis of soil types performed by Sherman County, the analysis area does not contain high-value farmland (Macnab, 2005).

Table 3-3 Detailed Soil Map Units Present in Analysis Area

Soil Series	Drainage Class	Erosion Potential	Farmland Classification
Anderly silt loam, 1 to 7 percent slopes	Well drained	High	Prime, if irrigated
Anderly silt loam, 7 to 15 percent slopes	Well drained	High	Statewide importance
Anderly silt loam, 15 to 35 percent south slopes	Well drained	High	Statewide importance
Endersby fine sandy loam, 0 to 3 percent slopes	Somewhat excessively drained	Not high	Prime, if irrigated
Endersby-Hermiston complex, 0 to 3 percent slopes	Well drained	Not high	Prime, if irrigated
Kuhl very stony very fine sandy loam, 3 to 20 percent slopes	Well drained	High	
Lickskillet-Rock outcrop complex, 40 to 70 percent south slopes	Well drained	Not high	
Lickskillet very stony loam, 7 to 40 percent south slopes	Well drained	Not high	
Lickskillet-Bakeoven complex, 2 to 20 percent slopes	Well drained	Not high	
Mikkalo silt loam, 2 to 7 percent slopes	Well drained	High	Prime, if irrigated
Mikkalo silt loam, 7 to 15 percent slopes	Well drained	High	Statewide importance
Nansene-Rock outcrop complex, 35 to 70 percent north slopes	Well drained	Not high	
Ritzville silt loam, 2 to 7 percent slopes	Well drained	Not high	Prime, if irrigated
Ritzville silt loam, 7 to 15 percent slopes	Well drained	Not high	Statewide importance
Rock outcrop-Rubble land-Lickskillet complex, 50 to 80 percent south slopes	Well drained	Not high	
Walla Walla silt loam, 1 to 7 percent slopes	Well drained	Not high	Prime, if irrigated
Walla Walla silt loam, 7 to 15 percent slopes	Well drained	Not high	Statewide importance
Walla Walla silt loam, 15 to 35 percent north slopes	Well drained	Not high	Statewide importance
Wato very fine sandy loam, 3 to 7 percent slopes	Well drained	Not high	Prime, if irrigated
Wato very fine sandy loam, 7 to 15 percent slopes	Well drained	Not high	Statewide importance

3.4.5 Regional Seismological Setting

Potential seismic sources that may affect the projects can be grouped into three independent categories: *subduction zone events*, *subcrustal events*, and *local crustal events*. Subduction zone events and subcrustal events have not occurred in the Pacific Northwest in post-settlement times, and are generally widely spaced in geologic time, they may occur during the life of the projects. Sudden crustal movements along relatively shallow, local faults in the Columbia-Deschutes Plateau area are rare, but have been responsible for local earthquakes.

3.5 Water Resources

The analysis area includes the proposed BPA transmission routes and substation areas; about 22,000 acres for the proposed Klondike III facilities; and about 25,000 acres for the proposed Biglow Canyon facilities.

3.5.1 Precipitation

Located on the eastern side of the Cascade Mountains, the area predominantly exhibits the continental climate of the Intermountain Region – extreme temperatures and low rainfall. However, the Columbia River Gorge provides a passageway for the normal eastward migration of ocean-conditioned air masses from the Pacific. Most of the annual rainfall in Sherman County occurs between November and February, reflecting the strong influence of the marine air masses entering from the Pacific Ocean. Mean monthly rainfall (measured 1971 to 2000 at Moro, Oregon) ranges from 0.31 inch in July to 1.57 inches in January. Between 1910 and 1995, average total annual precipitation was 11.76 inches in Wasco, Oregon (Oregon Climate Service, 2005).

3.5.2 Floodplains

There are no ***floodplains*** mapped by the Federal Emergency Management Agency (FEMA) within the analysis areas (FEMA, 1984).

3.5.3 Groundwater

The analysis area lies within the Columbia Plateau regional aquifer system. Groundwater resides in the cracks, fractures, and loose materials associated with the upper and lower boundaries of the numerous basalt (i.e., lava) flows associated with the basin. Groundwater can also be found in layers of unconsolidated-deposits that overlie the basalt flows (US Geological Survey [USGS], 2006).

In Sherman County, the basaltic rock aquifers tend to be the most productive; however, both basaltic rock and unconsolidated-deposits are present. Typical well depths range from 125 to 710 feet below ground surface and have yields ranging from less than 20 up to 2,000 gallons per minute. The principal ground water uses in the county are for public supply, domestic and commercial, agriculture, and industrial (USGS, 2006).

The analysis area is not in a State of Oregon Groundwater Management Area (Oregon Department of Environmental Quality [DEQ], 2005a).

3.5.4 Wetlands and Surface Water

Project wetland specialists conducted a site visit and wetland delineation on November 18, 2005, for the Klondike III/ Biglow Canyon Wind Integration Project. They

also reviewed recent documents from the Biglow Canyon Wind Farm ASC (CH2M HILL, 2005) and the Klondike III Wind Project ASC (DEA 2005) and field-verified the findings of these documents.

Wetland specialists used the U.S. Army Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) to complete the wetland delineation. This manual requires that all three wetland parameters –hydrology, hydrophytic (water-loving) plants, and hydric soils – be present for an area to be considered a wetland.

Wetland specialists reviewed reference materials prior to the field investigation to provide information regarding the possible presence of wetlands, water features, hydric soils, wetland hydrology, and site topography. The materials reviewed included precipitation data for Pendleton, Oregon (Oregon Climate Service, 2005); US Geological Survey (USGS) 7.5-minute Quadrangle maps; National Wetlands Inventory (NWI) maps; and the on-line Soil Survey of Sherman County Area, Oregon (USDA, 2005).

Most of the analysis area is in dry land wheat production. Few areas of native plant communities remain, occurring only in small patches along stream channels. (See Section 3.7, Vegetation, for further discussion on plant communities.)

Soils are relatively homogeneous throughout the wetland analysis area. The typical soil profile consisted of dark brown silt loam from 0 to 16 inches deep, with no mottles or other indicators of hydric soils present. This profile was observed throughout most of the wetland analysis area and was determined to be non-hydric (DEA, 2005; CH2MHill, 2005).

Within the entire analysis area, two jurisdictional wetlands and six jurisdictional drainage crossings were identified (see Map 6 and Table 3-4). A jurisdictional wetland or drainage is one that is considered a water of the state and regulated by the Oregon Department of State Lands and/or the Army Corps of Engineers. Many other non-jurisdictional drainages were identified in the analysis area, however these drainages are not regulated and most have been affected by agricultural practices such as plowing and no channels exist. They are not considered further in the analysis.

Table 3-4 Wetlands and Jurisdictional Drainages

Water Resource	Description*	Project Area
Wetland W1	POWHX in non-jurisdictional drainage in Emigrant Canyon	Biglow Canyon
Wetland W2	PEMIC in non-jurisdictional drainage	Klondike III
Drainage A	Jurisdictional drainage in Gerking Canyon	BPA Proposed Action
Drainage B	Jurisdictional drainage in Scott Canyon	BPA Proposed Action
Drainage C	Jurisdictional drainage in tributary to Helm Canyon	BPA Proposed Action
Drainage D	Jurisdictional drainage in Gerking Canyon (south of A)	Middle Alternative
Drainage E	Jurisdictional drainage in Gerking Canyon (south of A, D)	Middle Alternative
Drainage F	Jurisdictional drainage in tributary to China Hollow	Middle Alternative

* POWHX = Palustrine open water permanently flooded excavated wetland; PEM1C = Palustrine emergent persistent seasonal wetland.

3.5.4.1 BPA Proposed Action

BPA's Proposed Action crosses three drainages and no wetlands (see Map 6):

- Crossing A: A jurisdictional drainage was identified in Gerking Canyon about 1 mile west of the existing John Day Substation. This drainage runs north and is an unnamed intermittent tributary of the Columbia River. No water was observed, but a channel with bed and bank characteristics about 8 feet wide and 5 feet deep was present. Upland herbaceous ***species*** dominated the channel banks during the site visit.

- Crossing B: A jurisdictional drainage was identified just west of Scott Canyon Road and south of Herrin Lane. This drainage runs northwest and is an unnamed intermittent tributary of the Columbia River. No water was observed, but a channel with bed and bank characteristics about 5 feet wide and 3 feet deep was present. Upland herbaceous species dominated the channel during a site visit.

- Crossing C: A jurisdictional drainage was identified west of Helm Canyon, along Herrin Lane. This drainage runs north and is an unnamed intermittent tributary of Helm Canyon, which is an intermittent tributary of the Columbia River. No water was observed, but a channel with bed and bank characteristics about 2 feet wide and 2 feet deep was present. Upland herbaceous species dominated the channel during the site visit.

3.5.4.2 Middle Alternative

The Middle Alternative crosses three drainages and no wetlands:

- Crossing D: A jurisdictional drainage was identified about 3 miles southeast of the existing John Day Substation, just west of Scott Canyon Road. This drainage runs northwest and is the upstream portion of the drainage in Gerking Canyon described under Crossing A, above. No water was seen, but a channel with bed and bank characteristics about 5 feet wide and 3 feet deep was present. Upland herbaceous species dominated the channel during a site visit.

- Crossing E: The same unnamed jurisdictional drainage identified as Crossing D is re-crossed less than 1 mile upstream and retains the same character as Crossing D.

- Crossing F: A jurisdictional drainage exists along Medler Road, east of Scott Canyon Road. This drainage runs northwest and through a culvert under Medler Lane. The drainage is an unnamed intermittent tributary of China Hollow, which is an intermittent tributary of the Columbia River. No water was observed, but a channel with bed and bank characteristics about 5 feet wide and 2 feet deep was present. Upland herbaceous species dominated the channel during the site visit.

3.5.4.3 Wind Projects

According to the wetland delineation results from the Biglow Canyon Wind Farm ASC (Western EcoSystems Technology, Inc. [WEST], 2005), one wetland (W1) exists within the project boundary. The small wetland (0.06 acres) is identified as a palustrine open water permanently flooded excavated wetland (POWHX) and is in the eastern section of the analysis area, just north of Emigrant Springs Lane and between Weir Road and Rayburn Road (see Map 6). The wetland is associated with a non-jurisdictional drainage at the top of Emigrant Canyon and was likely formed when the small drainage was dammed near a residence.

One small wetland was identified within the Klondike III proposed site boundary (W2). This wetland was classified as palustrine emergent persistent seasonal wetland (PEM1C) and is associated with a discontinuous ephemeral or intermittent drainage that runs from west to east within the vicinity of Klondike Lane, eventually running underneath Klondike Lane via a bridge crossing near Webfoot. This drainage is not a state jurisdictional water since it does not directly connect to a fish-bearing stream (Oregon Department of State Lands [DSL], 2005). However, the wetland associated with the drainage is a state jurisdictional wetland (DSL, 2005).

3.6 Fish and Wildlife

The fish and wildlife analysis area consists of a 300-foot wide corridor centered on the proposed BPA ROW and substation facilities, a 300-foot wide corridor centered on Klondike III facilities, and a 500-foot wide corridor centered on Biglow Canyon facilities. Diurnal walking surveys as well as nighttime surveys for sensitive status species were conducted for Klondike III and Biglow Canyon.

The wildlife specialist reviewed reference materials prior to the field investigation to obtain information about the type, size and location of vegetative and wildlife resources within the project corridor. The materials reviewed included USGS 7.5-minute quadrangle maps; aerial photography at various scales, the Applications for Site Certificate for the Biglow Canyon Wind Farm (WEST, 2005), and the Klondike III Wind Project (DEA, 2005). The U.S. Fish and Wildlife Service (USFWS) and the Oregon Natural Heritage Information Center (ORNHIC) were queried for information on listed and sensitive species within the 5-mile data search area. The Oregon Department of Agriculture (ODA) was contacted for information about plant distribution, protection and conservation programs. The Oregon Department of Fish and Wildlife (ODFW) was contacted for information on fish and wildlife habitat requirements and distribution. On November 18, 2005, project wildlife specialists conducted a site visit to assess habitat conditions.

3.6.1 Fish Species and Fish Habitat

The analysis area contains no habitat for fish species. Only intermittent streams are present (see Section 3.6.2.6).

3.6.2 Wildlife Habitats within the Analysis Area

The following habitats are found within the analysis area.

3.6.2.1 Upland Trees

Upland tree areas included small native trees, typically black locust, usually found within or near dry washes or draws, or next to abandoned structures. Upland trees are rare in the analysis area. Sensitive species, such as loggerhead shrike and Swainson's hawk, nest and forage in this habitat, as well as more common species such as red-tailed hawk.

3.6.2.2 Shrub-Steppe

Shrub-steppe habitat within the analysis area occurs on slopes next to canyons and intermittent streams. It consists of an overstory of sagebrush and/or various native ***forbs*** and both rubber rabbitbrush and yellow rabbitbrush. The understory includes native grasses such as bluebunch wheatgrass, Sandberg bluegrass, and Idaho fescue, generally with a large percent cover of invasive grasses such as cheatgrass and bulbous bluegrass. Although the habitat is often weedy in places, it can provide some degree of structure and habitat for wildlife. Loggerhead shrike forage and nest in these areas, and the shrub structure provides habitat for white-tailed jackrabbit and other prey species for raptors.

3.6.2.3 Grassland

Grassland habitat within the analysis area consists mainly of invasive species such as cheatgrass, bulbous bluegrass, and tumblemustard. Native bunchgrasses remain in small patches, typically including species such as bluebunch wheatgrass and Sandberg's bluegrass. Native forbs such as rabbitbrush are present in small patches or in draws. White-tailed jackrabbit, burrowing owl, and long-billed curlew can use this habitat for foraging and nesting.

3.6.2.4 Conservation Reserve Program

CRP lands are found on the western end of the analysis area, near the John Day Substation and between Gerking Canyon and Scott Canyon, and within both wind analysis areas. Within the CRP areas, weed cover is generally low to moderate with scattered cheatgrass and bulbous bluegrass in the spaces between robust intermediate wheatgrass and crested wheatgrass. White-tailed jackrabbit, burrowing owl, and long-billed curlew can use this habitat for foraging and nesting.

3.6.2.5 Agricultural

Agricultural areas dominate the landscape and provide little habitat for wildlife other than for small mammals and forage for ungulates and raptors. Cultivated wheat is found in monoculture on these lands, with weedy forbs occasionally found on field perimeters. Raptors such as ferruginous hawk and rough-legged hawk could use this habitat for foraging.

3.6.2.6 Intermittent Streams

Three intermittent drainages were found within the analysis area: a jurisdictional drainage in Gerking Canyon about 1 mile west of the existing John Day Substation, a jurisdictional drainage just west of Scott Canyon Road more than 2 miles west of the substation, and a jurisdictional drainage 5 miles west of the substation south of and along Herrin Road west of Helm Canyon. No water was observed in any of these, but a channel with bed and bank characteristics of varying widths and depths was present. Western toad and other amphibians could use portions of these channels. Numerous other types of wildlife require access to water sources, which could be intermittently provided by this habitat type.

3.6.3 Species Analyzed

3.6.3.1 Threatened and Endangered Species

A number of federal and state ESA-listed and candidate wildlife species have the potential to exist within the analysis area: bald eagle, peregrine falcon, yellow-billed cuckoo, and Washington ground squirrel (USFWS, 2005 and ORNHIC, 2005). The yellow-billed cuckoo has likely been extirpated from Oregon (NatureServe, 2006), and is a riparian-dependent species, with no suitable breeding or foraging habitat present in the analysis area. The Washington ground squirrel does not occur in the analysis area, as their historical range is limited to areas east of the John Day River (USFWS, 2004).

Bald Eagle

The bald eagle is a federal and state-listed threatened species. Critical habitat has not been designated for the bald eagle. No suitable nesting or foraging sites are present in the analysis area. The closest bald eagle nest is on Browns Island on the Columbia River, west of the mouth of the Deschutes River (Isaacs, 2005), which is outside the study area for the proposed projects. Wintering bald eagles do not use the upland areas within and/or near the analysis area (Kohl, 2005).

Peregrine Falcon

The peregrine falcon is a State of Oregon endangered species. It has no status under the federal ESA because it was removed from the federal list of endangered and threatened wildlife on August 25, 1999 (USFWS, 1999). Peregrine falcons are limited to

areas that contain suitable nesting ledges. Cliffs and bluffs typically found along rivers and other large bodies of water can provide habitat for nesting peregrines. Falcons prefer to nest where the concentration of prey, generally smaller birds, is high and where habitat characteristics may increase prey vulnerability.

Peregrine falcons may occur in the analysis area year-round. There are three peregrine falcon nest sites in the vicinity of the project; however, none are located within the analysis area.

3.6.3.2 Sensitive/Special Status Species

Table 3-5 lists the sensitive and special status wildlife species that may occur in the analysis area, whether suitable habitat is present, and whether the species has been observed in or near the analysis area.

3.6.3.3 Common Wildlife Species

Elk, mule deer, bighorn sheep, pronghorn and common species such as coyote and badger occur in the analysis area. Many common avian species such as horned lark and meadowlark are also regularly found within the analysis area.

Table 3-5 Special Status/Sensitive Species with the Potential To Occur within the Analysis Area

Species *(Scientific Name)*	Federal Status	State Status	Observed/Documented in Klondike III Analysis Area	Occurrence/Habitat in Biglow Canyon Analysis Area	Occurrence/Habitat in BPA Analysis Area
Birds					
Bald eagle *(Haliaeetus leucocephalus)*	T/EA	T	No foraging or nesting habitat present. May use John Day and Columbia River canyons.	No foraging or nesting habitat present. May use John Day and Columbia River canyons.	No foraging or nesting habitat present. May use John Day and Columbia River Canyons.
Peregrine falcon *(Falco peregrinus anatum)*	--	E	Potential foraging habitat present. No nesting habitat present.	Potential foraging habitat present. No nesting habitat present.	Potential foraging habitat present. No nesting habitat present.
Golden eagle (*Aquila chrysaetos*)	EA	--	One nest documented in the project vicinity during 2001-2003 Klondike I and II surveys. Also documented in 2004-2005 avian baseline surveys.	Observed near John Day River rock outcrops during raptor nest survey.	Potential foraging habitat present; no nesting habitat present.
Swainson's hawk (*Buteo swainsoni*)	--	SV	11 nests documented in the project vicinity during 2001-2003 Klondike I and II surveys. 3 nests were documented in the project vicinity in 2004-2005 avian baseline surveys	18 observations from all surveys.	Potential foraging habitat present; nesting habitat present in upland trees.
Rough-legged hawk (*Buteo lagopus*)	--	--	Individuals documented within 2001-2003 Klondike I and II surveys as well as 2004-2005 avian baseline surveys.	Potential foraging habitat present; potential nesting habitat present in upland trees.	Potential foraging habitat present; potential nesting habitat present in upland trees.
Red-tailed hawk (*Buteo jamaicensis*)	--	--	18 nests documented in the project vicinity during 2001-2003 Klondike I and II surveys, and seen within the analysis area during 2005 sensitive species surveys.	Potential foraging habitat present; nesting habitat present.	Potential foraging habitat present; nesting habitat present.
Ferruginous hawk (*Buteo regalis*)	SoC	SC	Documented within 2001-2003 Klondike I and II surveys. None observed during 2004-2005 Klondike III surveys.	One observation, rare.	Potential foraging habitat present; potential nesting habitat present.
Long-billed curlew (*Numenius americanus*)	--	SV	Documented within 2001-2003 Klondike I and II surveys. Observed during Klondike III avian baseline surveys in eastern portion of the analysis area. No nests observed.	Observed south of proposed facility; ORNHIC lists use along John Day River up to Drapper Canyon mouth, historical nesting sites of broad county canyons.	Potential foraging habitat present; potential nesting habitat present in grasslands.
Bank swallow (*Riparia riparia*)	--	SU	None observed, probably migrant through analysis area.	None observed, probably migrant through analysis area.	None observed, probably migrant through analysis area.

Species ***(Scientific Name)***	**Federal Status**	**State Status**	**Observed/Documented in Klondike III Analysis Area**	**Occurrence/Habitat in Biglow Canyon Analysis Area**	**Occurrence/Habitat in BPA Analysis Area**
Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*)	SoC	--	Historical county record, no observations in ORNHIC query.	Historical county record, no observations in ORNHIC query.	Historical county record, no observations in ORNHIC query.
Western greater sage grouse (*Centrocercus urophasianus*)	SoC	SV	Regionally extirpated	Regionally extirpated	Regionally extirpated
Common nighthawk (*Chordeiles minor*)	--	SC	County record; possible, especially near riparian areas.	County record; possible, especially near riparian areas.	County record; possible, especially near riparian areas.
Eastern Oregon willow flycatcher (*Empidonax traillii adastus*)	SoC	SU	None observed	None observed, Biglow Canyon habitat possible.	None observed
Western burrowing owl (*Athene cunicularia hypugaea*)	SoC	SC	None observed. Suitable habitat may exist within grassland areas.	Historical county record; no observations in ORNHIC query.	Potential foraging habitat present; potential nesting habitat may exist within grassland areas.
Grasshopper sparrow (*Ammodramus savannarum*)	--	SV/SP	Common in non-agricultural habitat.	Common in non-agricultural habitat.	Common in non-agricultural habitat.
Lewis' woodpecker (*Melanerpes lewis*)	SoC	SC	No observations, probably migrant through facility area.	No observations, probably migrant through facility area.	No observations, probably migrant through facility area.
Western bluebird (*Sialia mexicana*)	--	SV	None observed, possible use of facility tree lots and/or barns	None observed, possible use of facility tree lots and/or barns.	None observed, possible use of facility tree lots and/or barns
Western meadowlark (*Sturnella neglecta*)	--	SC	Abundant.	Abundant.	Abundant.
Yellow-breasted chat (*Icteria virens*)	SoC	Soc	Habitat lacking; irregular migrant potentially through analysis area.	Habitat lacking; irregular migrant potentially through analysis area.	Habitat lacking; irregular migrant potentially through analysis area.
Loggerhead shrike (*Lanius ludovicianus*)	--	SV	Documented within 2001-2003 Klondike I and II surveys. Observed once during the winter avian baseline surveys. Documented in one location within the analysis area and two locations outside of the analysis area during 2005 sensitive species surveys.	Uncommon. Potential foraging habitat present; potential nesting habitat may exist within upland tree areas.	Potential foraging habitat present; potential nesting habitat may exist within upland tree areas.

Species ***(Scientific Name)***	**Federal Status**	**State Status**	**Observed/Documented in Klondike III Analysis Area**	**Occurrence/Habitat in Biglow Canyon Analysis Area**	**Occurrence/Habitat in BPA Analysis Area**
Mammals					
California bighorn sheep (*Ovis canadensis californiana*)	SoC	--	Unlikely to Occur	Observed east of John Day on south rim of Columbia River; might use river canyon slopes north and east of analysis area.	Observed east of John Day on south rim of Columbia River; might use river canyon slopes north and east of analysis area.
White-tailed jackrabbit (*Lepus townsendii*)	--	SU	Five individuals documented within 2001-2003 Klondike I and II surveys. At least one individual documented outside the analysis area during 2005 sensitive species surveys.	Observed, uncommon.	Potential foraging habitat present; species seen along project corridor during Biglow Canyon Wind Farm surveys in grasslands
Hoary bat (*Lasiurus cinereus*)			Probably migrant through analysis area.	Probably migrant through analysis area.	Probably migrant through analysis area.
Long-eared myotis (*Myotis evotis*)	SoC	SU	Unknown	Unknown	Unknown
Long-legged myotis (*Myotis volans*)	SoC	SU	Unknown	Unknown	Unknown
Pale western big-eared bat (*Corynorhinus townsendii pallescens*)	SoC	SC	Unknown	Unknown	Unknown
Pallid bat (*Antrozous pallidus pallidus*)	--	SV	Unknown	Unknown	Unknown
Silver-haired bat (*Lasionycteris noctivagans*)	SoC	SU	Probably migrant through analysis area.	Probably migrant through analysis area.	Probably migrant through analysis area.
Western small-footed myotis (*Myotis ciliolabrum*)	SoC	SU	Unknown	Unknown	Unknown
Yuma myotis (*Myotis yumanensis*)	SoC	--	Unknown	Unknown	Unknown
Amphibians and Reptiles					
Northern leopard frog (*Rana pretiosa*)	--	SC	None observed, not likely to occur.	None observed; habitat possible at pond near Emigrant Springs Road.	None observed, not likely to occur.
Western Toad *Bufo boreas*	--	SV	None observed, habitat possible in larger ravines.	Observed in upper Biglow Canyon.	None observed, habitat possible in larger ravines.
Painted turtle (*Chrysemys picta*)	--	SC		None observed; habitat possible at pond near Emigrant Springs Road.	No open water habitat present, not likely to occur.
Western rattlesnake (*Crotalus viridis; C.v. oregonus*)	--	SV	Likely common in native shrub-steppe and ravine habitat.	Observed; likely common in native shrub-steppe and ravine habitat.	Likely common in native shrub-steppe and ravine habitat.

EA *– Bald and Golden Eagle Protection Act;* ***E*** *– Endangered;* ***T*** *– Threatened;* ***SoC*** *– Species of Concern;*
SC *– State Sensitive-Critical;* ***SV*** *– State Sensitive-Vulnerable;* ***SU*** *– State Sensitive-Undetermined Status.*

3.7 Vegetation

The analysis area for vegetation consists of the area within 300 feet of the proposed BPA facilities (including centerlines of the two alternative transmission line routes), within 300 feet of the proposed Klondike III Wind Project facilities, and within 500 feet of the proposed Biglow Canyon Wind Farm project facilities, including wind turbine corridor boundaries. On November 18, 2005, project vegetation specialists conducted a site visit to assess vegetation conditions.

Vegetation communities found in the analysis area include the following: upland trees, shrub-steppe, CRP, and agriculture. These communities, their representative species, and typical location in the landscape are described in Section 3.6.2.

3.7.1 Special-Status Plant Species (Federal and State)

No threatened or endangered plant species were identified as present in the analysis area (Oregon Natural Heritage Information Center, 2005). The following rare or special status species may occur in the project vicinity; however, there are no records of any of these species within the analysis area and none were found during field visits (DEA, 2005; CH2MHill, 2005).

- Henderson's needlegrass (*Achnatherum hendersonii*)
- Dwarf suncup (*Camissonia pygmaea*)
- Vernal pool mousetail (*Myosurus sessilis*)
- Whitehead navarretia (*Navarretia leucocephala*)
- Laurence's milkvetch (*Astragalus collinus* var. *laurentii*)
- Disappearing monkeyflower (*Mimulus evanescens*)
- Liverwort monkeyflower (*Mimulus jungermannioides*)
- Northern wormwood (*Atemisia campestris* v. *wormskioldii*)
- Henderson's ricegrass (*Achnatherum collinus* v. *laurentii*)
- Robinson's onion (*Allium robinsonii*)

3.7.2 Weeds and Undesirable Vegetation

3.7.2.1 Agricultural Lands

Agricultural lands within the analysis area are plowed, seeded, and harvested annually, mainly with wheat species. Herbicide spraying is common, widespread, and takes place at several stages during the year. The adjacent edge habitat is dominated by weeds typically found in these margins, mainly cheatgrass, Russian thistle, and ryegrass.

3.7.2.2 Other Lands

Native vegetation communities, such as upland trees, shrub-steppe, and grasslands within the analysis area have a large proportion of non-native and invasive weed species such as cheatgrass, bulbous bluegrass, and tumblemustard. Generally, no weed control is conducted within these communities. Within CRP lands, weed cover is generally low to moderate with scattered cheatgrass and bulbous bluegrass. Weed control in CRP lands is required, and would generally include spraying for broadleaf weeds. This herbicide control is most intensive in the early period of CRP establishment, and is not usually continued after full establishment of CRP has taken place. Burning is a seldom-used control method for weeds due to expense and fire danger.

3.8 Visual Resources

The analysis area for visual resources is the area within 30 miles of the Klondike III Wind Project and the Biglow Canyon Wind Farm. This area includes BPA's action alternatives.

The general landscape character features rolling hills in dry land winter wheat production or grasses dedicated to conservation easements through the CRP administered by the NRCS. Most of the analysis area is in wheat production. Very little acreage of native plant communities remains, occurring in small patches along tributaries and unnamed drainages to the Columbia, John Day, and Deschutes rivers.

The Deschutes River Canyon and John Day River Canyon are important features draining to the Columbia River. Basalt cliffs and rock outcrops are typical within the river canyons and are important visual elements. Where vegetation is not in agricultural production or conservation, it is characterized by shrub-steppe habitat typical to Central Oregon. Trees are very sparse, usually occurring in ravines or near the few home sites as shelter belts. The Cascade Mountains, including Mount Hood and other peaks and ridgelines, are visible in the distant background during clear conditions when not blocked by local topography.

Multiple transmission and distribution lines cross the analysis area as well as transportation corridors including the Columbia River, I-84, U.S. 97, SR-206, and SR-14. Existing wind turbines and substation facilities are also visible.

Several important visual resources have been identified in the analysis area (see Table 3-6 and Map 7). Summaries of these resources are provided in this section.

Table 3-6 Important Visual Resources within the Analysis Area

Visual Resource	Direction/Distance (miles) from		
	BPA Action Alternatives	**Klondike III Wind Project**	**Biglow Canyon Wind Farm**
Columbia River Gorge National Scenic Area	West, 9	Northwest, 12.2	West, 10
John Day River Canyon	East, 2.5	East, 0.8	West, 23
Oregon National Historic Trail High Potential Sites:			
Fourmile Canyon	East, 25	East, 20	East, 23
John Day River Crossing (a.k.a. McDonald Ferry)	Southeast, 4	East, 2	Southeast, 6
Biggs Junction	West, 7	Northwest, 11	West, 8
Deschutes River Crossing	West, 10	Northwest, 13.5	West, 11
The Dalles Complex	West, 24	West, 28	West, 25
Lower Deschutes River Canyon	West, 9	West, 8	West, 10
Lower Klickitat River Canyon	West, 25	Northwest, 27.5	West, 26
Journey Through Time Scenic Byway	Southwest, 1.5	West, 0.5	West, 2

3.8.1 Columbia River Gorge National Scenic Area

The Columbia River Gorge National Scenic Area (CRGNSA) is managed for an "unparalleled combination of scenery, geology, plants, wildlife, and multicultural history" (Columbia River Gorge Commission and USDA Forest Service [USFS], 1992). The exceptional beauty of this region is largely derived from its diverse character. Key Viewing Areas (KVAs) are important viewpoints open to the public offering opportunities to view the Gorge. KVAs within the analysis area include the Historic Columbia River Highway, I-84, Washington SR-14, the Columbia River, and Rowena Plateau (i.e., Tom McCall Preserve). Designated Scenic Travel Corridors in the analysis area include the Historic Columbia River Highway, I-84, SR-14, U.S. 97 and SR-142.

3.8.2 John Day River Canyon

The John Day River landscape within the analysis area features high desert communities of sagebrush and juniper with intermingled private ranches adding visual interest along the river (BLM, 2000). The John Day River Canyon (i.e., the area from rim to rim) is identified as an "area of high visual quality" (BLM, 1986). The BLM manages its lands in this area as a Visual Resource Management (VRM) Class II resource, meaning management activities resulting in changes to the existing character of the landscape may be allowed, provided they do not attract the attention of the casual observer (BLM, 2000).

Beginning at Tumwater Falls near river mile 10 upstream through the analysis area, the river is a designated Federal Wild and Scenic River and classified as Recreational. Outstanding remarkable values in this segment include "scenic, recreation, fish, wildlife, geological, paleontological, and archaeological" values. The segment is designated as a

State Scenic Waterway pursuant to the Oregon State Scenic Waterways Act, ORS 390.805-390.925.

The Two Rivers Resource Management Plan Record of Decision (BLM, 1986) identifies two Special Management Areas relevant to this project: the Oregon Trail Historic Sites at Fourmile Canyon and McDonald Ferry, and the John Day River Canyon. For the trail sites, "the unusual qualities of these sites will be maintained and protected" (BLM, 1986). For the canyon, "areas of high visual and natural quality will continue to be protected while allowing other compatible uses in the same area" (BLM, 1986).

3.8.3 Oregon National Historic Trail

In 1978, Congress authorized the Oregon National Historic Trail Committee to commemorate the historic Oregon Trail and to promote its preservation, interpretation, public use, and appreciation. The National Park Service produced *The Management and Use Plan Update Final Environmental Impact Statement Oregon National Historic Trail and Mormon Pioneer National Historic Trail* (USDI National Park Service [NPS], 1999), to coordinate broad-based policies, guidelines, and standards for administering the trail to guide its protection, interpretation, and continued use.

Within the analysis area, the plan identifies five High-Potential Sites based on "historic significance, the presence of visible historic remnants, scenic quality, and relative freedom from intrusion" (NPS, 1999). These sites include Fourmile Canyon, John Day River Crossing (a.k.a. McDonald Ferry), Biggs Junction, Deschutes River Crossing, and The Dalles Complex. The plan does not identify specific scenic or aesthetic values in the analysis area beyond these five sites. Intact segments or other visual evidence (e.g., wagon ruts, scars) of the trail are not known to exist within the analysis area. Nearly all evidence of the trail within the analysis area has been obliterated through agricultural practices over the years.

3.8.4 Lower Deschutes River Canyon

The Lower Deschutes River is a designated Federal Wild and Scenic River and Oregon State Scenic Waterway. The Lower Deschutes Canyon "contains a diversity of landforms, vegetation and color" (BLM, 2001) where the river has carved a dramatic canyon through rugged Columbia River basalt flows. Riparian vegetation provides stark contrast against the broken reddish brown canyon walls. Transportation corridors (roads and railroad), and rural development occur in several areas throughout the canyon.

3.8.5 Lower Klickitat River Canyon

The lower 10 miles of the Klickitat River from its confluence with Wheeler Creek, near the town of Pitt, to its confluence with the Columbia River is designated a Federal Wild and Scenic River with a Recreational classification. Outstandingly remarkable resources include the river's free-flowing nature, resident and anadromous fish and their

habitats, Native American dip-net fishing, and the geology of the lower gorge (USFS, 1991).

3.8.6 Journey Through Time Scenic Byway

The Journey Through Time Scenic Byway is administered through the ODOT Scenic Byway Program. The portion of the scenic byway within the analysis area is US 97 in Oregon.

The Journey Through Time Management Plan speaks to the rural heritage and history of the 286-mile route through north central Oregon. The plan establishes four goals: create jobs; maintain rural lifestyles (i.e., support traditional industries of agriculture and timber); protect important values (e.g., historical attractions); and build identity for the north central Oregon region. The plan identifies the communities of Wasco, Moro, and Grass Valley, the Historic Oregon Trail and Barlow Road, and the Sherman County Museum as points of interest within the analysis area.

3.9 Socioeconomics

This analysis uses U.S. Census Bureau information from the 1990 and 2000 decennial censuses but, where appropriate, also includes data from state and local agencies. Sherman County, its incorporated communities, and block groups (BG) are the census areas used for determining the effects to the socioeconomic characteristics in the analysis area. Because only one census tract (9501) covers the entire county, county and census tract demographic information are the same, and because of the low population of the analysis area, block groups are quite large and include some geographic areas that would not likely be affected by the proposed project.

There are two BGs within the analysis area. Block Group 1 covers the eastern portion of the county, including the town of Rufus, from US 97 north of Wasco and OR 206, south of Wasco to the eastern county boundary. Wasco is not part of BG 1. Block Group 2 includes the town of Wasco and all land west of US 97 and OR 206 from the Columbia River to the western county boundary and down to just north of the community of Moro. The southern boundary is generally Monkland Lane.

3.9.1 Population

The analysis area is entirely within Sherman County, which has four incorporated communities: Grass Valley, Moro, Rufus and Wasco. Rufus and Wasco are near the proposed project; Moro (county seat) and Grass Valley are in the southern portion of the county. The estimated 2003 population for Sherman County is 1,900 residents. Wasco is the largest community in the county with an estimated 380 residents.

Between 1990 and 2003, Sherman County population decreased slightly by 18 residents, or about one percent of its total population. Rufus has lost residents,

declining by about 9 percent since 1990, while Wasco grew slightly, adding a handful of residents for the same period (Population Research Center, 2005).

According to census data, population in Sherman County rural areas appears to be more stable than local communities. Population increases in rural areas countered losses in incorporated communities in BG 1. Overall, BG 1 lost 15 residents between 1990 and 2000, but Rufus (included in BG population), actually lost 27 residents, which means that rural portions of the BG appear to have added 12 residents, reducing the overall loss of population in the entire BG to less than what was lost in Rufus. BG 2 grew between 1990 and 2000, increasing its population by about 7 percent (39 residents). Most of this growth also appears to have occurred in rural areas because Wasco, the block group's population center, grew by only seven residents.

3.9.2 Housing

The most recent housing data for Sherman County and its communities are from the 2000 decennial census. Because population has generally remained stable or declined in the county, current vacancy rates are assumed to be similar to those reported in the 2000 Census. The 2000 census reported that there were 935 housing units in Sherman County, as shown in Table 3-7. Of those, 523 are within BG 1 and 2.

Vacancy rates are shown in Table 3-7. In 2000, housing vacancy rates in the county area were relatively high, with the highest vacancy rates found in Rufus at 21 percent.

Table 3-7 Housing Supply and Availability in Sherman County and Project Vicinity, 2000

Census Geographic Area	Housing Units			
	Total	Occupied	Vacant	Percent Vacant
Sherman County	935	797	138	14.8%
Rufus	162	128	34	21.0%
Wasco	199	171	28	14.1%
Census Tract 9501	935	797	138	14.8%
CT 9501, BG 1	230	192	38	16.5%
CT 9501, BG 2	293	256	37	12.6%

Source: US Census Bureau SF-3

3.9.3 Lodging

Several lodging options are available near the proposed projects and have been used in the past during construction of the Klondike I and II Wind Projects. During construction of the first two phases, construction workers were housed in motels in the communities of Moro and Biggs Junction, and in a recreational vehicle (RV) park in Wasco. There are also several motels located in The Dalles in Wasco County west of Sherman County.

As a part of the Biglow Canyon Wind Farm ASC (CH2MHill, 2005), PGE identified over 750 hotel and motel rooms within a 30-mile range of the proposed Biglow Canyon Wind Farm. Additional rooms could also be available in establishments not identified as a part of the application. Other lodging could be found in Goldendale, Washington, and in overnight facilities at Oregon state parks and private RV campgrounds. Memaloose and Deschutes state parks together have nearly 100 sites that can accommodate RVs. Additional sites are also available for tents at both parks.

3.9.4 Social Characteristics

3.9.4.1 Age

The analysis area and Sherman County as a whole have a higher percentage of residents 50 years or older than the state as a whole. The population within the analysis area is generally similar to the state in the percentage of residents younger than 19 years old, but the percentage of county residents between 20 and 29 years old accounts for a much smaller portion of the population compared to other age cohorts and the state. The drop in residents within that age cohort could be attributed to young people leaving the county after high school and lack of local employment or college education opportunities in the county. The percentage of the county population between 30 and 39 years is within 4 percent of the state's overall population for that age group. For all age groups over 40, the county percentage (as well as that of Rufus, Wasco, and BG 2) exceeds that of the state as a whole.

3.9.4.2 Poverty

According to the 2000 census, the percentage of individuals and families living in poverty in Oregon was 11.6 percent and 7.9 percent, respectively, which was lower than Sherman County where the percentage of individuals and families in poverty was 14.6 percent and 12.3 percent, respectively. BG 1 has a slightly lower percentage of individuals in poverty, but has a higher percentage of families in poverty than the county as a whole. BG 2 is just the opposite, with a higher number of individuals in poverty at 15 percent and about 10 percent of families in poverty. Wasco has a lower poverty rate for individuals and families than the county. In all geographies, residents between 18 and 64 years old accounted for the highest percentage of individuals in poverty.

3.9.4.3 Race and Ethnicity

Minorities within Sherman County account for just 3 percent of the total population, compared to the state where about 16.5 percent of the total population is within a minority group. In general, minorities account for between 3 to 5 percent of the population in the analysis area.

3.9.5 Unemployment

Since 2000 Sherman County has had higher unemployment levels than the state. Sherman County's unemployment rate climbed from a relatively low 5.9 percent in 2000 to 11.9 percent in 2003. The increase was due to the loss of a single industry, aluminum manufacturing, which relied on low power costs to provide a comparative advantage. When aluminum production slowed in 2001, unemployment in the county increased rapidly. While unemployment rates have fallen recently because people have moved out of the county, travel outside the county for work, or because some unemployed may no longer be seeking work, the county still has an unemployment rate much higher than the state as a whole. In 2004, the county unemployment rate was nearly 10 percent, more than 2 percent higher than Oregon's. While some seasonal employment in the county is available, income from seasonal positions is generally lower than what the aluminum plants paid and the employment is generally less stable (Oregon Employment Department, 2005).

3.10 Cultural Resources

Cultural resources field inventories were conducted within the proposed alternative BPA transmission line routes and substation areas, within a 300-foot corridor around the proposed Klondike III Wind Project facilities, and within a 500-foot corridor around the proposed Biglow Canyon Wind Farm facilities. A portion of BPA's Middle Alternative was not surveyed because BPA could not obtain permission from current landowners to conduct the field inventory.

The field inventories identified historic properties and cultural resources. Methods of investigation included a literature review and records search (including records of the Oregon State Historic Preservation Office [SHPO]), as well as field investigations. The fieldwork consisted of the systematic pedestrian survey of the proposed turbine string alignments, laydown areas, new roads, overhead and underground utility lines, substations, meteorological towers, improvements to existing roads, and a wildlife mitigation area. In addition to the field inventories, BPA has consulted with five upper Columbia River tribes – the Confederated Tribes of the Warm Springs Indian Reservation, the Confederated Tribes of the Umatilla Reservation, the Yakama Indian Nation, the Wanapum Tribe, and the Nez Perce Tribe – about the proposed project.

3.10.1 Resources near the Proposed Transmission Line Routes

The archaeological survey examined about 473 acres and identified four archaeological resources within the analysis area (Archaeological Investigations Northwest, Inc. [AINW], 2005a, 2005b). Two of the resources are located within the Proposed Action corridor, and the remaining two resources are within the proposed Middle Alternative corridor. The four resources consist of two prehistoric isolates (fewer than 10 artifacts), one historic-period isolate, and one historic-period site. No historic or archeological resources were identified near the proposed substation site.

A projectile point fragment was found on a gently-rolling high point overlooking Biglow and Emigrant canyons. One colorless machine-made glass bottle neck and two fragments of a colorless square glass bottle were also found within 16 feet of the projectile point. These bottle fragments had no identifying marks but likely date to the early or mid-1900s.

Scattered historic-period artifacts and the remains of a demolished structure were found north of Klondike Lane. Within the proposed transmission line corridor, AINW found one brick fragment, one piece of window glass, and four pieces of whiteware ceramics. The structural remains are located outside the current analysis area. The second school in Sherman County, Jacks School, was established in the 1880s (AINW, 2005a).

Artifacts found near Wasco-Rufus Road included one aqua glass machine-made bottle base that had no marks, one aqua glass machine-made bottle neck, one insulator fragment, and one colorless glass bottle base. It is likely that these artifacts are roadside debris rather than evidence of more extensive deposits.

A single tan cryptocrystalline silicate flake was found at the bottom of Gerking Canyon. No other artifacts were found within the analysis area at this location, and the context of this find suggests that this flake is a secondary deposit.

Most of the proposed BPA action alternatives' routes are within lands that were under wheat cultivation at the time of the survey. These fields varied between recently-planted winter wheat that was up to 4 inches tall, harvested wheat (stubble and debris left on the ground), and plowed fields (no debris or new growth). Ground surface visibility within recently-planted fields ranged between 20 and 80 percent, depending upon how recently the ground was seeded. Wheat fields that had been harvested had highly variable ground surface visibility (between 5 and 95 percent). Portions of the analysis area were also left fallow or used as range land, resulting in a ground cover of tall grass and virtually no ground surface visibility.

Modern debris was found scattered sporadically along most of the roadside portions of the analysis area, and especially alongside major connector roads (such as Wasco-Rufus Road). Very few developments, modern or historic-period, are within the proposed route corridors. One complex of historic-period buildings is located on the north side of Medler Lane. These buildings were used by the Medler family, one of the early and important residents of Sherman County (AINW, 2005a).

Both the Proposed Action and Middle Alternative cross portions of the Oregon Trail (known at the time as the Emigrant Road) through what are today cultivated fields. While the portion of the Oregon Trail crossed by the Middle Alternative was not surveyed, no evidence of the trail was observed during the pedestrian survey of the Proposed Action. One fossilized large mammal limb bone was observed in a road cut on the north side of Gerking Canyon Road.

There are no historic resources listed on or eligible for listing on the National Register of Historic Places (NRHP).

3.10.2 Klondike III Wind Project

As part of the ASC process, field surveys identified seven archaeological resources (Archaeological Investigations Northwest, Inc. 2006, DEA, 2005). Three of these resources are prehistoric archaeological isolates (each represents the find of a single artifact); a fourth is a small assemblage of historic-period refuse (also recorded as an archaeological isolate), and another is an historic period early Oregon homestead. This property may be eligible for listing on the NRHP. Two additional areas with potential resources were also identified during a pedestrian survey; however, these areas had inadequate ground visibility due to the presence of crops to determine the existence of any cultural resource site.

A number of other historic-period resources within the analysis area were also identified. Most of these resources are buildings and structures associated with private ranching operations. Most of these resources have been altered or modified from their original design or lack any distinguishing characteristics.

The Oregon Trail alignment through the Klondike III Wind Project area is a designated historic trail under both federal and Oregon statutes. The alignment of the trail, as best it can be reconstructed, crosses the northeastern portion of the Klondike III Wind Project area. No physical evidence of the trail was observed at any of these locations or anywhere else in the field survey. All of the reported locations of intact trail segments were agricultural fields, and farming activity is likely to have obliterated most—if not all—physical traces of the trail.

During a site visit with the elders of the Warm Springs Indian Reservation, tribal members expressed concern about cultural resources being encountered during wind turbine construction in some portions of the Klondike III Wind Project area.

3.10.3 Biglow Canyon Wind Farm

There are no historic properties in the area of the Biglow Canyon Wind Farm listed on the NRHP. Field surveys identified three historic sites and one historic archaeological site that were recorded with the SHPO. Homestead A was a wheat farm and cattle ranch operation. Homestead B is an abandoned Victorian farmhouse with associated outbuildings and cached older farm equipment which does not likely meet criteria for listing on the NRHP.

The historic building is an isolated garage building presently used for storage. This building is architecturally undistinguished and it is not known to be associated with events that have made a major contribution to the broad patterns of our history, nor is it associated with the lives of persons significant in our past. The building does not likely meet NRHP eligibility criteria.

The archaeological site is a small historic period surface dump feature. This site is small, lacks appreciable depth, and (it or its artifact contents) cannot be clearly associated with any particular person in the historic record. This archaeological site is believed to be ineligible for listing in the NRHP.

During a site visit with the elders of the Warm Springs Indian Reservation, tribal members expressed concern about cultural resources being encountered during wind turbine construction in some portions of the Biglow Canyon Wind Farm area.

3.11 Noise, Public Health and Safety

Transmission facilities and wind projects provide electricity for heating, lighting and other services essential for public health and safety. These same facilities can potentially harm humans. Contact with transmission lines or turbines can kill or injure people and damage aircraft. This section describes public health and safety concerns such as electric shock, fires, and ***electric and magnetic fields*** related to transmission facilities, wind projects or construction activities.

Potential hazards include fire (both natural and human-caused), and interference with aircraft.

The Federal Aviation Administration establishes requirements for towers and other tall structures such as wind turbines that could potentially interfere with aircraft safety. Structures taller than 200 feet may require a flashing warning light for aircraft safety.

Transmission lines, like all electric devices and equipment, produce electric and magnetic fields, most commonly referred to as EMF. Current, the flow of electric charge in a wire, produces the magnetic fields. Voltage, the force that drives the current, is the force of the electric field. The strength of electric and magnetic fields depends on the design of the line and on the distance from the line. Field strength decreases rapidly with distance.

3.11.1 Noise

Audible noise (AN), as defined here, represents an unwanted sound, as from a transmission line, transformer, airport, or vehicular traffic. Sound is a pressure wave caused by a sound source vibrating or displacing air. The ear converts the pressure fluctuations into auditory sensations. AN from a source is superimposed on the background or ambient noise that is present before the source is introduced.

Environmental noise, including transmission line noise, is usually measured in ***decibels*** on the A-weighted scale (dBA). This scale models sound as it corresponds to human perception. Table 3-8 shows typical noise levels for common sources expressed in dBA.

Table 3-8 Common Noise Levels

Sound Level dBA	Noise Source or Effect
110	Rock and roll band
80	Truck at 50 feet
70	Gas lawnmower at 100 feet
60	Normal conversation indoors
50	Moderate rain falling on foliage
40	Refrigerators
26	Ambient noise in analysis area
25	Woods during calm breeze

3.11.1.1 Transmission Line Noise

Corona is the partial electrical breakdown of the insulating properties of air around the conductors of a transmission line. In a small volume near the surface of the conductors, energy and heat are dissipated. Part of this energy is in the form of small local pressure changes that result in audible noise. Corona-generated audible noise can be characterized as a hissing, crackling sound that, under certain conditions, is accompanied by a 120-Hz hum. Corona-generated audible noise is of concern primarily for contemporary lines operating at voltages of 345-kV or higher and generally during foul weather.

The conductors of high-voltage transmission lines, i.e., those of 230-kV and above, are designed to be corona-free under ideal conditions. However, protrusions on the conductor surface, particularly water droplets on or dripping off the conductors, cause electrical fields near the conductor surface to exceed corona onset levels, and corona occurs. Therefore, audible noise from transmission lines is generally a foul-weather (wet conductor) phenomenon. Wet conductors can occur during periods of rain, fog, snow or icing. Based on the meteorological records near the routes of the proposed transmission lines, such conditions are expected to occur about 6 percent of the time during the year in the Wasco area.

For a few months after the line would be built, residual grease or oil on the conductors could cause water to bead up on the surface. This would result in more corona sources and a slightly higher level of audible noise and electromagnetic interference in the line. However, as new conductors “age” in the first few months, the level of corona activity decreases to the predicted equilibrium value. During fair weather, insects and dust can also collect on conductors and serve as a source of corona.

The area where the two transmission line alternatives would be located has an ambient noise level of about 26 dBA (CH2MHill, 2005).

3.11.1.2 BPA Substation Noise

Audible noise from substations is generated predominantly by equipment such as transformers, reactors and other wire-wound equipment. It is characterized by a 120 Hz hum that is associated with magnetic-field caused vibrations in the equipment. Noise from such equipment varies by voltage and other operating conditions. The BPA design level for substation noise is 50 dBA at the substation property line for new construction (USDOE, 2006). The design level is met by obtaining equipment that meets specified noise limits and, for new substations, by securing a no–build buffer beyond the substation perimeter fence. The existing John Day 500-kV Substation has no noise-making equipment and has an ambient noise level of about 26 dBA (CH2MHill, 2005). Periodically, disconnect switches engage and emit a blast.

3.11.1.3 Wind Projects

The project area is rural, and ambient noise levels are low (about 26 dBA [CH2MHill]), with infrequent noise from agricultural activities. DEQ regulations at OAR 340-035-0035 establish noise standards at sensitive receptors. At the proposed project sites, residences are the only noise sensitive properties identified. The noise level in the area where the two wind projects would be located has an ambient noise level of about 26 dBA (CH2MHill, 2005).

New noise sources on sites that have not previously been used for commercial or industrial purposes have a limit on the allowable increase over existing ambient noise levels. Generally, sources on new sites may not increase the noise levels by more than 10 dBA unless the person who owns the noise sensitive property executes a legally effective easement or real covenant that benefits the property on which the wind energy facility is located. This effectively allows for a noise level of no more than 36 dBA (26 dBA background + 10 dBA increase) at noise sensitive properties.

Wind turbines and transformers can cause noise that may exceed the noise limit and would require mitigation.

3.11.2 Electric and Magnetic Fields (EMF)

Electric and magnetic fields are found around any electrical wiring, including household wiring and electrical appliances and equipment. Throughout a home, the electric field strength from wiring and appliances is typically less than 0.01 kilovolts per meter (kV/m). However, fields of 0.1 kV/m and higher can be found very close to electrical appliances.

3.11.2.1 Electric Fields

There are no national guidelines or standards in the Unities States for electrical fields from transmission lines. Oregon has adopted a maximum of 9-kV/m in areas that are accessible by the public and applies only to transmission lines of 230-kV or above

longer than 16 km (10 miles) and crossing more than one city or county in the state. It is basically a safety standard to reduce risks of electric shocks and burns.

BPA designs new transmission lines to meet its electric-field guideline of 9-kV/m maximum strength on the ROW and maximum field strength of 5-kV/m at the edge of the ROW.

3.11.2.2 Magnetic Fields

Average magnetic field strength in most homes (away from electrical appliances and home wiring) is typically less than 2 ***milligauss*** (mG). Very close to appliances with high current, fields of tens or hundreds of mG are present. Typical magnetic field strengths for some common electrical appliances are given in Table 3-9. Unlike electric fields, magnetic fields from outside power lines are not reduced in strength by trees or building materials. Transmission lines and distribution lines (the lines feeding a neighborhood and a home), can be a major source of magnetic field exposure throughout a home located close to the line.

There are no national standards or guidelines in the U.S. for magnetic fields. Oregon and Washington have no magnetic field limits and BPA does not have a guideline for magnetic fields exposures.

Table 3-9 Typical Magnetic Field Strengths

Appliance	Magnetic Field (mG) (One foot from a common appliance)
Coffee maker	1 – 1.5
Electric range	4 - 40
Hair dryer	0.1 to 70
Television	0.4 – 20
Vacuum cleaner	20-200
Electric Blanket	15-100

3.11.2.3 Electromagnetic Interference

Corona on transmission line conductors can generate electromagnetic noise in the frequency bands used for radio and television signals. The noise can cause radio and television interference (RI and TVI). In certain circumstances, corona-generated electromagnetic interference (EMI) can also affect radio reception in the AM broadcast band (535 to 1605 kilohertz [kHz]), communications systems and other sensitive receivers. FM radio reception is rarely affected. Generally only residences very near to transmission lines can be affected by RI.

Interference with electromagnetic signals by corona-generated noise is generally associated with lines operating at voltages of 345-kV and above. This is especially true of interference with television signals.

Corona-caused TVI occurs during foul weather and is generally of concern for transmission lines with voltages of 345-kV and higher, and only for conventional receivers within about 600 feet of such a line.

No state in the U.S. has limits for RI or TVI. Electromagnetic interference from power lines is governed by the Federal Trade Communication Commission (FCC).

3.11.2.4 Wind Projects

The wind projects would use 34.5-kV collectors to collect power from the wind turbines. Klondike III's circuits would all be below ground; Biglow Canyon would use above ground and below ground collectors. Above ground circuits emit electric fields and are measurable at the ground; however, buried cables, buried at a depth of 4 feet, emit no electric fields since the electric field is contained within the buried cables.

Maximum magnetic fields are measured at 1 meter above the ground. Both buried cables and overhead conductors emit magnetic fields.

3.11.3 Toxic and Hazardous Substances

3.11.3.1 BPA Operations

Minimal amounts of hazardous waste result from routine maintenance procedures performed on substation equipment and transmission lines. Kinds and volumes of waste such as oily rags, minor leaks from vehicles, etc., depend on the maintenance procedure.

3.11.3.2 BPA Substation Equipment

The two circuit breakers and associated disconnect switches BPA proposes to add at the existing John Day 500-kV Substation would not contain oil. The proposed John Day 230-kV Substation would have an oil containment system for the new transformers. The new transformers would not contain PCBs. BPA has a Spill Prevention Control and Countermeasure Plan that puts in place protocols and procedures for response in case a spill occurs.

3.11.3.3 Wind Projects Operations

Hazardous materials that would be used on the projects would include lubricating oils, cleaners and pesticides that would be used primarily during operations, but potentially during construction as well. These materials would be properly stored at the O&M facilities for both projects.

3.11.4 BPA Right-of-Way Vegetation Management

Vegetation is maintained for safe operation and to allow access to the towers. The vegetation would be managed as guided by BPA's Transmission System Vegetation Management Program Environmental Impact Statement (EIS) (DOE/EIS-0285), which is incorporated by reference, and with landowners' management practices.

3.11.5 Fire and Fire Protection

Fires on or near the ROW can jeopardize safe and reliable operation of transmission lines. Besides physical damage from heat and flames, smoke and hot gases from a fire can cause arcing between lines, between lines and a tower, or between lines and the ground. Such occurrences can pose a threat to the safety of personnel in the area, such as firefighters, and can result in line outages. To prevent fires and other hazards, safe clearances are maintained between the ground and the lines. BPA also prohibits storage of flammable materials on its ROWs. Transmission towers are tall structures that may be struck by lightning. Because the towers are electrically grounded, the current from the lightning strike passes directly into the ground, with minimal risk of starting a fire.

The proposed wind projects and transmission line alternatives are in the North Sherman Fire Protection District based in Wasco. The District provides fire protection and has trained EMT volunteers, although the District does not provide ambulance service. The District contracts with the Moro Rural Fire Protection District to provide ambulance service. The North Sherman Rural Fire Protection District has one volunteer trained in high angle rescue, specifically for potential accidents occurring on wind generation towers or aboveground collector lines. No incidents at existing wind power facilities within the district have occurred that would require this service. Local farmers also provide fire suppression and are often the first to respond because of the large service areas. Local service providers state that farmers often have their own fire equipment and also often respond to emergencies.

3.11.6 Sheriff Services

The Sherman County Sheriff's Department provides police service for all of Sherman County, including the proposed transmission line alternatives and wind projects. Other sheriff's departments within the analysis area include the Gilliam County Sheriff's Department and the Wasco County Sheriff's Department. The Wasco County Sheriff's Department is the largest of the three Oregon departments, with 17 full-time deputies, due to the much larger population it serves. Sherman and Gilliam counties employ four to five full-time deputies. All three departments have agreements to provide backup service for each other if needed.

According to the Sherman County Sheriff, no events have occurred at the existing wind facilities that required law enforcement services.

3.11.7 Health Care

The Mid-Columbia Medical Center, located in The Dalles, is the only full service medical facility located within the analysis area. The center provides emergency services as well as surgery. If an accident were to occur at the site, ambulance service from the Moro Rural Fire Protection District would transport patients to the hospital. Evacuation via helicopter is also available, if needed.

3.12 Air Quality

The Clean Air Act of 1970 empowered the U.S. Environmental Protection Agency (EPA) to establish air quality standards for six criteria air pollutants: ozone, carbon monoxide (CO), lead, nitrogen dioxide, particulate matter (PM-2.5, PM-10), and sulfur dioxide. The EPA uses these six criteria pollutants as indicators of air quality. For each of these pollutants, the EPA has determined a maximum concentration above which adverse effects on human health may occur. These threshold concentrations are called National Ambient Air Quality Standards (NAAQS), and it is when an area exceeds these standards that it is designated as a nonattainment area. Pollution control measures are mandated for federal actions in nonattainment areas.

A nonattainment area can be listed for any one, or more, of the criteria pollutants. An area that was once a nonattainment area, but has since improved its air quality enough so that it now meets the EPA established air quality standards, is up-graded to a **maintenance area** designation. Maintenance areas also have pollution controls imposed on them, but because the air quality is not as poor as in nonattainment areas, the control standards are not as strict in maintenance areas. All other areas not listed by the EPA for air quality degradation are considered **attainment areas**.

Sherman County is classified as an attainment area. In fact, Sherman County has the lowest total emissions of any county in Oregon. The most recent EPA air emission data available for the criteria pollutants is from 2001 and is provided for: carbon monoxide (CO), nitrogen oxides (NOx), volatile organic compounds (VOC), sulfur dioxide (SO_2), particulate matter (PM 10 and PM 2.5), and ammonia. In 2001, Sherman County's total emissions were 13,806 tons. Table 3-10 shows Sherman County's air emissions data for 2001 and how the county ranked, compared to other counties in Oregon (EPA, 2006).

According to the 2000 U.S. Census data, the economy of Sherman County is driven by agriculture. Sherman County has a total of 531,200 acres; 304,138 acres of this land is tillable. Barley, wheat, and cattle make up a large percentage of the agricultural base. A crop is raised only once every two years; land lies fallow during the off years. Beef cattle graze about 223,000 acres (Oregon Department of Environmental Quality and Oregon Department of Agriculture, 2006).

Table 3-10 Emission Amounts in Sherman County, Oregon

Pollutant	Amount of Emissions (in tons)	Rank Compared to Other Oregon Counties
Carbon Monoxide (CO)	7,259	Lowest in OR
Nitrogen Oxides (NOx)	1,434	3rd lowest after adjacent Wheeler County and Wallowa County
Volatile Organic Compounds (VOCs)	813	Lowest in OR
Sulfur Dioxide (SO_2)	109	Lowest in OR
Particulate Matter (PM 2.5)	837	Lowest in OR
Particulate Matter (PM 10)	3,064	Second lowest after adjacent Wheeler County
Ammonia	1,127	Average, near the median

Agriculture provides the economic base of not only Sherman County, but of the state of Oregon as well. Oregon's farmers and ranchers recognize the importance of being responsible environmental stewards to sustain the natural resource base (Oregon Department of Environmental Quality and Oregon Department of Agriculture, 2006). Environmentally, air pollution can: damage soils, water, crops, vegetation, manmade materials, property, animals and wildlife, impair visibility, affect climate and weather, and create transportation hazards (Washington State Department of Ecology, 2003). Large concentrated cattle/animal operations emit pollutants such as ammonia and methane and agricultural fields are a source of particulate matter. Evidence would suggest that these activities contribute significantly to Sherman County's total nonpoint emissions (Oregon Department of Environmental Quality and Oregon Department of Agriculture, 2006).

Oregon is a member of AIRNow, a government-backed program which compiles data and releases air quality forecasts. Specifically, through AIRNow, EPA, NOAA, the National Park Service, news media, and tribal, state, and local agencies work together to report conditions for ozone and particle pollution (AIRNow, 2006).

Oregon's Department of Environmental Quality (DEQ), in conjunction with AIRNow, maintains the Air Quality Index (AQI) for Oregon. The AQI is a color-coded tool which broadcasts if air pollution levels are good (green), moderate (yellow), unhealthy for sensitive groups (orange), and unhealthy for all groups (red) (see Table 3-11).

Table 3-11 Air Quality Index (AQI): Particle Pollution

Index Values	Levels of Health Concern	Cautionary Statements
0-50	Good	None
51-100*	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion.
101-150	Unhealthy for Sensitive Groups	People with heart or lung disease, older adults, and children should reduce prolonged or heavy exertion.
151-200	Unhealthy	People with heart or lung disease, older adults, and children should avoid prolonged or heavy exertion. Everyone else should reduce prolonged or heavy exertion.
201-300	Very Unhealthy	People with heart or lung disease, older adults, and children should avoid all physical activity outdoors. Everyone else should avoid prolonged or heavy exertion.
301-500	Hazardous	People with heart or lung disease, older adults, and children should remain indoors and keep activity levels low. Everyone else should avoid all physical activity outdoors.

*An AQI of 100 for particles up to 2.5 micrometers in diameter corresponds to a level of 40 micrograms per cubic meter (averaged over 24 hours). An AQI of 100 for particles up to 10 micrometers in diameter corresponds to a level of 150 micrograms per cubic meter (averaged over 24 hours) (Oregon Department of Environmental Quality, 2006b).

There is an AQI monitoring station located in The Dalles, Oregon (about 25 miles west of the proposed project site). Both 2005 and 2006 had approximately one month each worth of days where the air quality was measured at less than good (see Table 3-12).

Table 3-12 Air Quality Index—Monitoring Data from The Dalles, OR

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	No AQI
2005	326 days	33 days	0	0	6 days
2004	199 days	21 days	1 day	0	145 days

For PM2.5, the 24-hour average National Ambient Air Quality Standard (NAAQS) is 65 µg/m³. For PM10, the 24-hour average NAAQS is 150 µg/m³. Oregon adopted these same federal standards. Between 1992 and 2003, there were no days in The Dalles when PM2.5 exceeded the NAAQS (Oregon Department of Environmental Quality. 2006a).

In December 2005, the EPA Administrator signed proposed revisions to its national air quality standards for particulate matter. The proposal recommends lowering the level of the 24-hour PM2.5 NAAQS from the 65 µg/m³ to 35 µg/m³ and the 24-hour PM10 NAAQS from 150 µg/m³ to 70 µg/m³. The EPA must issue final standards by September 27, 2006, after considering comments received during the public comment period (US EPA, December 2005).

If the 24-hour NAAQS for PM2.5 and PM10 is lowered, some Pacific Northwest Counties may fall into nonattainment status. The following areas may be most susceptible to future NAAQS exceedences:

1. Population centers in valley bottoms with persistent fall and winter inversions;
2. Areas where wood burning is common for heating homes; and
3. Areas with extensive, outdoor, agricultural and/or silvicultural burning during inversion periods (Yakima Regional Clean Air Authority. 2006).

The proposed project area, and Sherman County as a whole, does not fall into these categories.